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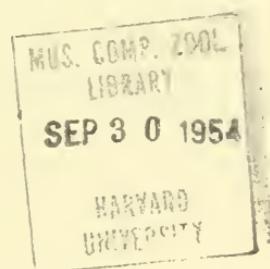
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# A New Subspecies of Bat (*Myotis velifer*) from Southeastern California and Arizona

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TERRY A. VAUGHAN

The first specimens of *Myotis velifer* from California were taken in 1909 by C. L. Camp at Needles, San Bernardino County (Grinnell, Univ. California Publ. Zool., 12:266, March 20, 1914), and subsequently this bat was recorded from farther south in the lower Colorado River Valley at the Riverside Mountains, Riverside County (Stager, Jour. Mamm., 20:226, May 14, 1939). West of the Rocky Mountains the species is known to occur also in at least the southern two-thirds of Arizona, southwestern New Mexico, and is recorded from Thistle Valley, Utah, on the basis of two young specimens in alcohol (Miller and Allen, Bull. U. S. Nat. Mus., 144:87, May 25, 1928). Through comparisons made possible by the acquisition, in the last few years, of mammals from many parts of Mexico by the Museum of Natural History of the University of Kansas, it became evident that *Myotis velifer* in California and Arizona was an heretofore unnamed subspecies. It may be known as

## *Myotis velifer brevis* new subspecies

*Myotis velifer*, Grinnell, Univ. California Publ. Zool., 12:266, March 20, 1914; Grinnell, H. W., Univ. California Publ. Zool., 12:259, January 31, 1918.

*Myotis velifer velifer*, Miller and Allen, Bull. U. S. Nat. Mus., 144:87, May 25, 1928; Burt, Jour. Mamm., 14:115, May 15, 1933; Burt, Misc. Publ. Mus. Zool. Univ. Michigan, 39:22, February 14, 1938; Hatfield, Bull. Chicago Acad. Sci., 6:146, January 12, 1942.

**Type.**—Male, adult, No. 22631, Museum of Natural History, University of Kansas; Madera Canyon, 5,000 ft., Santa Rita Mountains, Pima County, Arizona; obtained on March 12, 1948, by J. R. Alcorn; original number 5571.

**Range.**—Lower Colorado River Valley in California and Arizona, through southern two-thirds of Arizona, southwestern New Mexico, and northern Sonora; southern limits of range unknown.

**Diagnosis.**—Size small (see measurements). Color pale, upper parts being near (16")j Snuff Brown (capitalized color terms are of Ridgeway, Color Standards and Color Nomenclature, Washington, D. C., 1912); underparts dull Pinkish Buff to nearly white in some specimens; ears and flight membranes near (16")l Olive Brown; skull small.

**Comparisons.**—From *Myotis velifer incautus* (J. A. Allen), *Myotis velifer brevis* differs in: Size smaller; color slightly darker; skull smaller. From *Myotis velifer peninsularis* Miller, *M. v. brevis* differs in: Size larger; color darker; skull larger. From *Myotis velifer velifer* (J. A. Allen), *M. v. brevis* differs in: Size smaller; pelage paler, with less extensive basal dark portion; skull smaller.

TABLE 1.—MEASUREMENTS, IN MILLIMETERS, OF *MYOTIS VELIFER*

	Sex	Number averaged	Average	Range
<i>M. v. velifer</i> , 4 km. E Las Vigas, 8,500 ft., Veracruz, Mexico.				
Total length.....	♂	15	97.1	92.0–101.0
" "	♀	9	99.0	93.0–103.0
Length of forearm.....	♂	27	44.1	42.1–46.0
" "	♀	18	44.7	43.3–46.1
Condyllobasal length.....	♂	15	15.9	15.4–16.2
" "	♀	9	16.0	15.7–16.4
Interorbital breadth.....	♂	15	4.2	3.9–4.2
" "	♀	9	4.1	3.9–4.3
Mastoid breadth.....	♂	15	8.4	8.2–8.5
" "	♀	9	8.4	8.2–8.6
Zygomatic breadth.....	♂	15	10.7	10.4–10.9
" "	♀	9	10.7	10.4–11.2

*M. v. incautus*, 4 mi. E Sherman, Major Co., Oklahoma.

Total length.....	♂	11	101.5	97.0–107.0
Length of forearm.....	♂	9	45.4	44.6–47.3
Condyllobasal length.....	♂	11	16.4	15.9–16.7
Interorbital breadth.....	♂	11	4.2	4.0–4.5
Mastoid breadth.....	♂	11	8.8	8.5–9.1
Zygomatic breadth.....	♂	11	10.9	10.5–11.3

*M. v. brevis*, Riverside Mtns., 35 mi. N Blythe, Riverside Co., California.

Total length.....	♂	8	96.6	91.5–99.0
" "	♀	5	94.6	91.0–97.0
Length of forearm.....	♂	45	41.8	40.4–44.5
" "	♀	6	42.1	40.7–43.4
Condyllobasal length.....	♂	16	15.5	15.1–15.8
" "	♀	5	15.4	15.1–15.8
Interorbital breadth.....	♂	16	4.0	3.8–4.2
" "	♀	5	3.9	3.9–4.0
Mastoid breadth.....	♂	16	8.2	7.8–8.6
" "	♀	5	8.3	8.0–8.5
Zygomatic breadth.....	♂	15	10.4	10.2–10.7
" "	♀	5	10.4	10.1–10.6

*Remarks*.—Miller and Allen (*op. cit.* :90) considered specimens of *Myotis velifer* from Roosevelt, Arizona, to be intergrades between *M. v. velifer* and *M. v. incautus* because the color varied greatly and certain pale individuals resembled *incautus*. These workers regarded specimens from southern Arizona as nearly typical examples of *M. v. velifer*. I have examined the specimens from Roosevelt, Arizona, and many from various localities in the southern part of the state, and was impressed by the large amount of color varia-

tion. Marked variation in color at a single locality, however, is known in other bats. Benson (Jour. Mamm., 30:50, February 14, 1949), for example, found striking variation in *Myotis volans* in California. The specimens of *Myotis velifer* from Roosevelt, Arizona, referred to *M. v. velifer* by Miller and Allen (*op. cit.*:90), actually average significantly smaller than specimens of this subspecies from Mexico, and than specimens of the large subspecies *M. v. incautus* from the Great Plains, and therefore, with reference to size, are not intergrades between these subspecies. All of the Arizonan material is here referred to *M. v. brevis*.

The "bald spot," that is to say, the sparsely furred area between the shoulders, which is characteristic of this species, reaches its most extreme condition in *Myotis velifer brevis*. In most of thirty-five specimens taken in mid-June, 1953, in California, the nape of the neck, the interscapular area, and a connected area extending laterally onto each shoulder are so lightly furred that the skin shows through conspicuously. In one male of this series a strip approximately four millimeters wide extending along the mid-dorsal line from between the shoulders to the rump is mostly devoid of hair. These sparsely-furred areas are less evident in live animals than in study skins and specimens in alcohol, because the back of the head in life lies against the depression between the shoulders and conceals most of the thinly furred areas.

The pelage of *Myotis velifer brevis* is shorter than that of either *M. v. velifer* or *M. v. incautus* and gives the impression of being less dense. The dorsal hairs average approximately 4.5 millimeters long in *M. v. brevis* taken 35 miles north of Blythe, Riverside County, California, in May, eight millimeters in *M. v. velifer* collected at Las Vigas, Veracruz, in January, and six millimeters in *M. v. incautus* taken four and one half miles southwest of Sun City, Barber County, Kansas, in November. More than seasonal differences in length of pelage is indicated by measurements of additional specimens of each subspecies taken at different times of the year.

Considering its extensive geographic range and its occurrence in many contrasting environments, *Myotis velifer* varies little; and the variation that does occur is continuous. The change from the large, dark Mexican subspecies to the small, pale Arizonan subspecies is gradual. The reason may lie in the ecology of *M. velifer*. It seems that there are few barriers separating populations. Waterless areas and regions lacking suitable roosting places such as fissures in cliffs and outcrops of rocks, caves and buildings, may exclude the species from certain areas, but there are few areas of any great size within

the range of the species that lack these features. Also, these bats are strong fliers; even between fairly distant colonies there may be considerable gene flow. The geographic variation observed probably is the result of adaptation, on the part of populations in different parts of the range of the species, to different environments. The lack of any effective barriers except possibly distance between populations tends to limit subspeciation and to cause gradual variation between subspecies. *M. v. peninsularis*, the subspecies at the southern tip of Baja California, is not considered in this discussion. So far as known, however, that subspecies is completely isolated from the mainland populations of *M. velifer*.

For the opportunity to examine specimens under their care I wish to thank Dr. William H. Burt of the University of Michigan Museum of Zoology, Dr. Rollin H. Baker of the Museum of Natural History of the University of Kansas, and Dr. Donald F. Hoffmeister of the University of Illinois Museum of Natural History. I am indebted also to persons in charge of the Biological Surveys Collection and the National Museum for the loan of critical material, and to Dr. E. Raymond Hall for suggestions. The following symbols are used to designate the source of specimens: BS—Biological Surveys Collection, IM—University of Illinois Museum of Natural History, KU—Museum of Natural History of the University of Kansas, MM—University of Michigan Museum of Zoology, NM—United States National Museum, TV—collection of Terry A. Vaughan.

*Specimens examined.*—Total, 110, distributed as follows:

**Arizona:** Mohave Co.: Big Sandy Creek, 3 BS. Yavapai Co.: Camp Verde, 3 KU. Gila Co.: 5 mi. SW Roosevelt, 8 BS. Maricopa Co.: Gila Bend, 1 BS. Graham Co.: Snow Flat, Graham Mountains, 1 IM; Bonita, Graham Mountains, 1 IM. Pima Co.: Tucson, 1 NM; Madera Canyon, 5000 ft., Santa Rita Mountains, 2 KU. Santa Cruz Co.: Madera Canyon, 6000 ft., Santa Rita Mountains, 2 KU. Cochise Co.: 8 mi. W Fort Huachuca, 26 IM; Hereford, 4 IM; 3 mi. SW Hereford, 1 IM; 14 mi. SW Fort Huachuca, 1 IM; San Bernardino Ranch, 4 NM.

**California:** Riverside Co.: Riverside Mountains, 35 mi. N Blythe, 51 (21 KU, 30 TV).

**Sonora:** Santa Maria Mine, El Tigre Mountains, 1 MM.

*Transmitted March 22, 1954.*